



DOING MORE WITH LESS  
The Efficient Way to Optimize Asset  
Performance & Reliability

A Whitepaper by Ivara Corporation

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## **Abstract**

Companies today need to deliver their products and services in a reliable manner – and they need to do this within shrinking budgets and with fewer resources. Although most companies have been efficient in executing maintenance work, that work is often too little, too late or too much, too soon. With budget pressures and fierce competition, it is time to move to the next level in maintenance effectiveness – rethinking asset maintenance programs to ensure the right work is being done at the right time.

This paper will introduce current advancements in reliability and maintenance practices and technology that have enabled organizations to move to a proactive, condition-based approach to maintenance. The benefits of this approach are strategic and include increased revenue and output, improved customer satisfaction and safety and environmental integrity. Improving maintenance effectiveness and focusing more on asset performance and reliability will also optimize cost efficiencies.

## **Key Elements of Business Success**

Success in the midst of competition depends upon a process of “how” to do what needs to be done, use of technology tools, skilled and motivated staff, as well as, leveraging of technologies and systems common in today’s companies. In capital-intensive industries, the goal of longer-term profitability is strongly connected to the performance and reliability of company assets (equipment).

Companies successful in optimizing asset performance and reliability have:

- Focused on the business process of equipment reliability – ensuring that the behaviors and activities that people do each day are .
- Competency development in reliability practices, especially effective methods of work identification.
- Adopted asset performance management technology to support the practices and process their asset care team is using to ensure equipment performance and reliability.

With a complete reliability solution, you will significantly increase the effectiveness of the maintenance and operations functions in optimizing asset reliability and therefore driving business results.

## **The Need for Reliability Expertise**

The world of maintenance is in a state of flux. New patterns of equipment failure and new techniques have given rise to a growing need for a new strategic approach to maintenance. A coherent review of maintenance strategies can only be undertaken by reviewing maintenance requirements of each piece of equipment in its operating context. The evaluation of maintenance policies and the selection of maintenance tasks is a key aspect of maintenance management and most engineers do it continuously. But the range of options is now so large and new techniques are emerging at such a pace that it is no longer possible to do it on an informal basis. That is where reliability practices can help.

A range of reliability services are now available, including reliability strategy development, maintenance process assessment, business case justification, asset prioritization, risk prioritization and various work identification services like RCM2, Maintenance Task Analysis and PdM Needs Assessment. RCM2 in particular has been used successfully in a number of industries around the world. However, it is still new to industry in general, so companies which apply it now could enjoy a competitive advantage, at least to the extent that maintenance affects competitive standing.

## Advances in Asset Reliability Software

Ivara’s innovative asset reliability software, Ivara EXP, improves maintenance effectiveness by identifying the right work to do at the right time. It allows organizations to define, implement, and manage effective and proactive maintenance programs that take into account all predictive, preventive, and corrective maintenance activities.

Studies originally conducted in 1968, 1973 and 1980 across diverse industries have shown that approximately 80% of all mechanical, electrical and structural failures are random in nature and cannot be effectively correlated to time or run hours.

To effectively manage these random failures and deliver reliable equipment performance, maintenance organizations must move away from traditional time-based preventive maintenance practices and move toward condition-based triggers for maintenance interventions. To accomplish this, companies are relying more and more on optimizing preventive maintenance (data-driven), predictive maintenance (thermography, vibration, non-destructive testing) and online data collection of equipment health indicators (pressure, temperature, flow, amps, etc.)

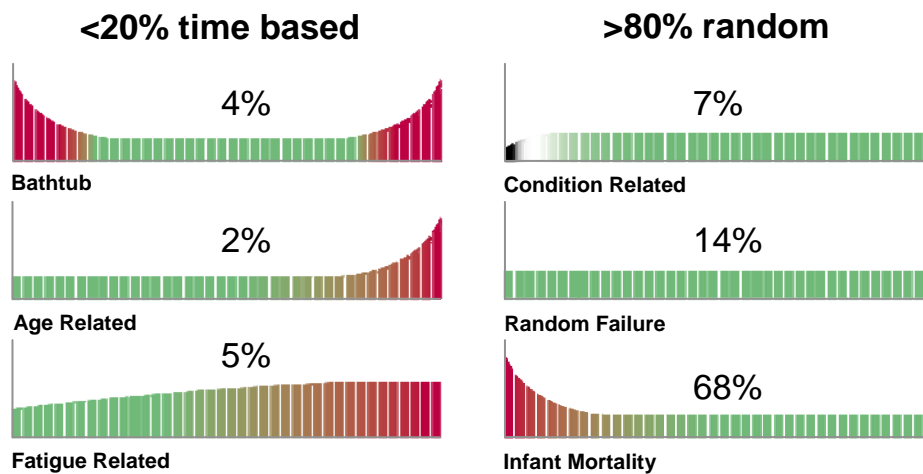
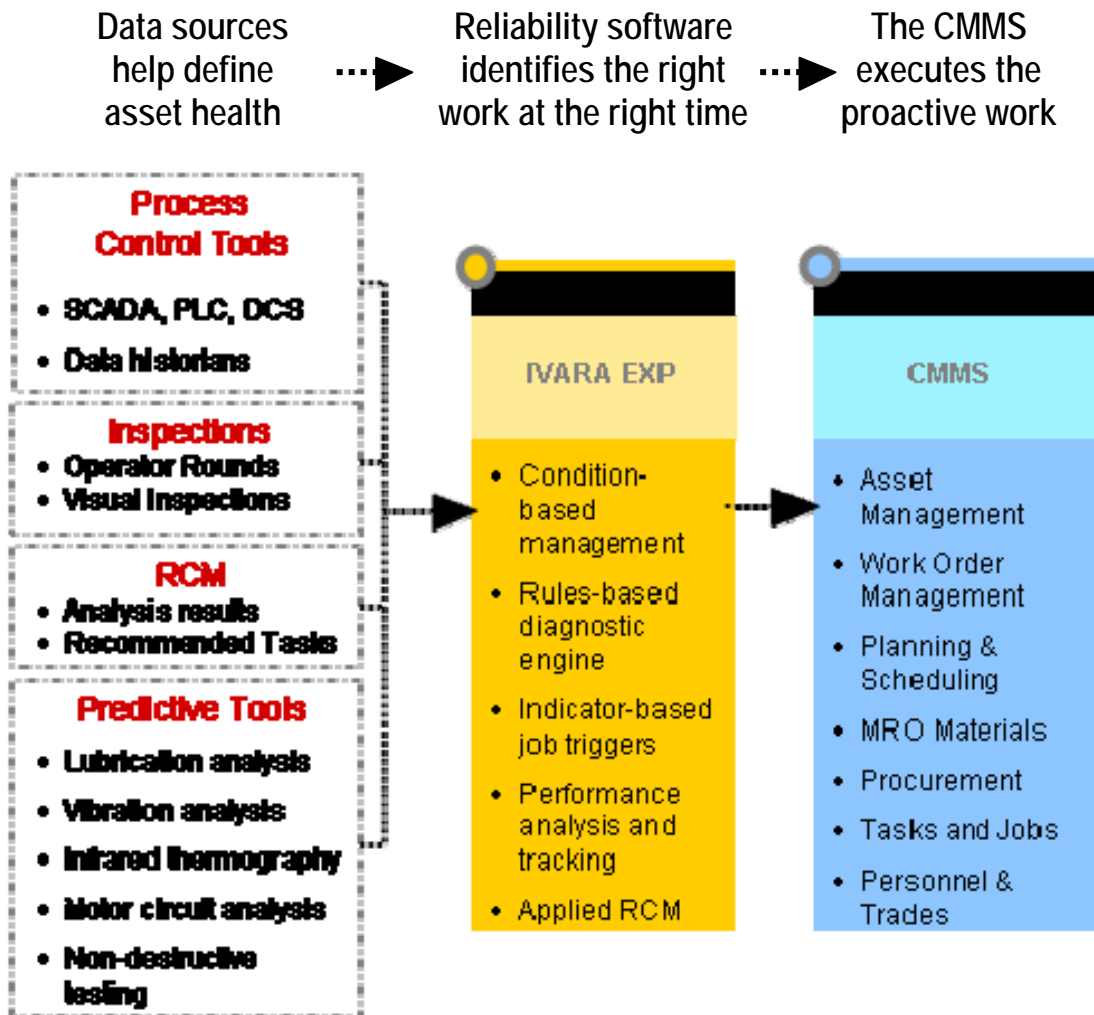


Figure 1: The Reality of Failure - Six failure patterns

These condition-monitoring activities result in massive amounts of data related to the operating health of the equipment. In order to be of any value to maintenance and operations, the data must be effectively analyzed, compared against defined “normal” states and then the results of the analysis must be communicated. Effectively done, this will lead maintenance to do the right work, at the right time.

Ivara EXP collects, stores, displays, analyzes and manages all asset condition and state information. The software accepts data from online sources, predictive maintenance technologies and visual (or other sensory) inspections collected from operator rounds or routine inspections. It then analyses the data and presents the results visually as flashing alarms. In addition, the software has the ability to compare various data points to get a true picture of the operating health of the equipment (for example, comparing transformer oil analysis, thermography and the last visual inspection results to give an overall picture of transformer health).



*Figure 2: How Ivara EXP Asset Reliability Software Works*

With asset reliability software, organizations can increase the effectiveness of their maintenance by providing a tool that supports a condition-based maintenance strategy. Condition-based maintenance improves the reliability an organization can achieve by allowing the right work to be done at the right time.

The implementation of asset reliability software leverages existing technologies including Predictive Maintenance applications and CMMS. Asset reliability software is complementary to, and adds value to, any CMMS implementation since it addresses the necessary upfront strategic planning, work identification and ongoing condition monitoring to feed the CMMS the right work at the right time.

In addition to reliability practices and reliability technology, optimizing asset reliability and sustaining a comprehensive equipment reliability strategy requires an underlying business process. When supported by the proper software tools and reliability practices, a reliability-driven maintenance process is the key to instilling a proactive work culture.

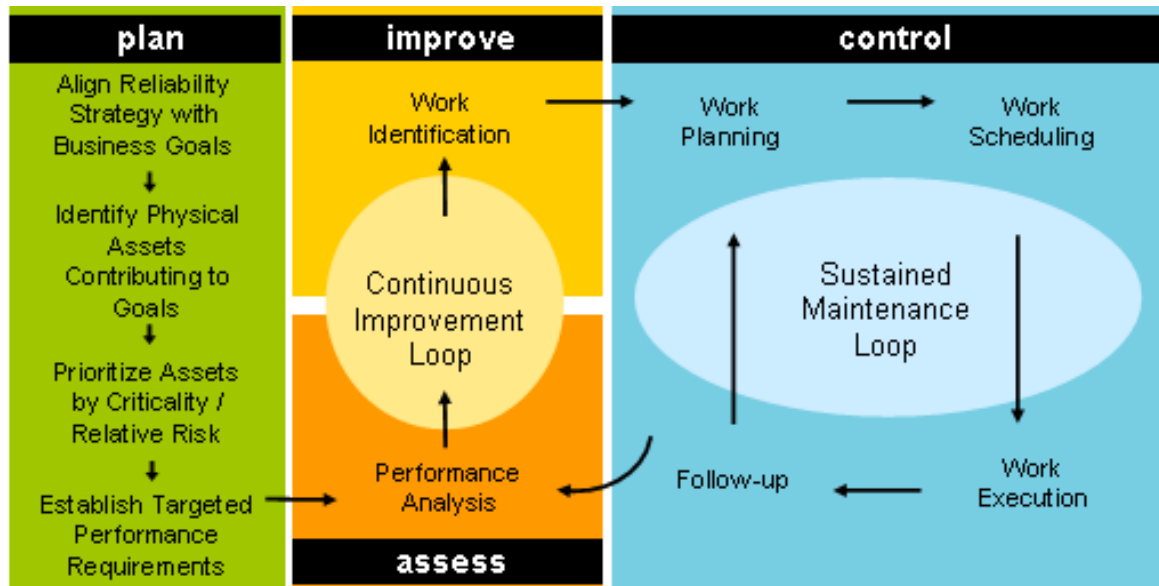


Figure 3: Reliability-Driven Maintenance Process

### A Reliability-Driven Maintenance Process

Like many business processes, a reliability-driven maintenance process includes the following stages; plan, assess, improve and control. In the plan stage, maintenance and reliability goals are aligned with the business goals of the company. You need to identify the assets that contribute most to achieving the business goals and determine the assets for which failure risk is highest in terms of impact on business performance. For these assets, establish specific performance targets and focus reliability improvement efforts.

The assess stage analyzes the performance of the asset and prioritizes gaps in performance. Performance gaps are functional failures or “the inability to meet performance requirements”. In the improve stage, one or more Work Identification strategies are selected, such as RCM coupled with maintenance task analysis, in order to address potential failures in a timely manner. The maintenance plan for an asset may include a mix of preventive maintenance, predictive maintenance and run-to-failure decisions. Work Identification is the cornerstone of the reliability driven maintenance process, identifying the right work at the right time.

Once work is identified, efforts move into the Control stage for planning, scheduling and execution. Many capital-intensive industries today use a CMMS (Computerized Managed Maintenance System) to maximize the efficiency of this work execution phase. If properly followed up, the control stage of the process provides valuable information back to the Assess stage in terms of the actual performance of the assets, resulting in a continuous improvement loop that maximizes asset reliability. The assess stage evaluates and makes visible an organization’s effectiveness in each element of the reliability driven maintenance process.

We need reliability practices and technology to support a reliability-driven maintenance process and achieve long-term success. The result is that maintenance and operations work together to optimize asset reliability; maintenance performs the right work at the right time – the minimum work required to keep an asset operating at its desired performance level.

## Leveraging Existing Technologies & Processes

Organizations need to be able to collect pertinent information and effectively assess the aging effects on equipment and how to determine the right work to do at the right time – at minimum cost to the organization.

To manage an asset's health or condition, plant personnel are collecting, analyzing and acting upon huge masses of data, from a variety of sources. Typically, either this data is scattered about the plant or it takes a significant amount of manpower to collect and interpret this data. Either way, maintenance is not as effective as it could be.

Paper check sheets from operator rounds and maintenance inspections pile up on desks where they provide no value. It is difficult to leverage predictive technology data because the data exists only in standalone databases or reports. Data that is stored in a SCADA system or a data historian may not be available in a timely manner to make the right decisions about equipment maintenance programs. Reliability technology enables effective action on all data by maintenance and reliability organizations.

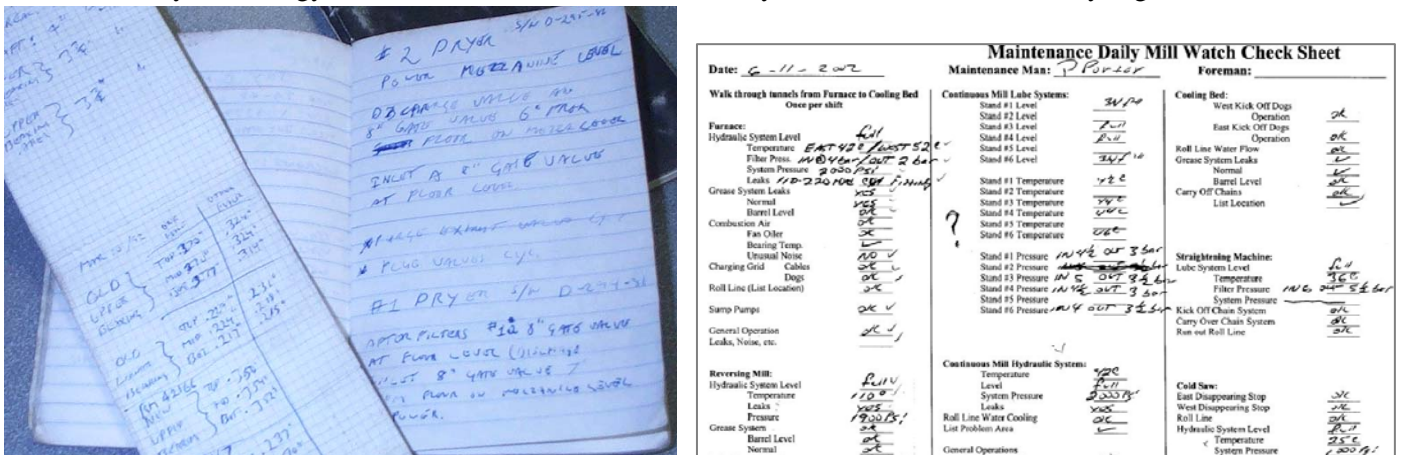


Figure 4: With traditional information management (employee black books) or organized information management (paper check sheets) information and knowledge is often missed or lost

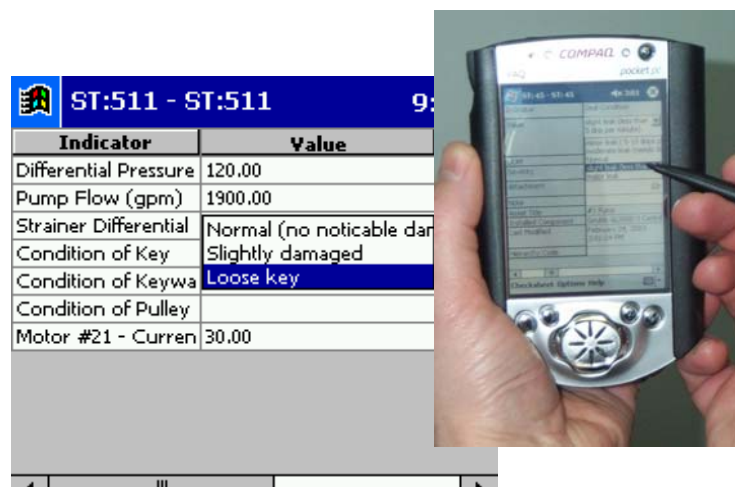


Figure 5: Handheld devices provide efficient and accurate data collection

Condition data can be fed from any source into reliability software. Hand-held devices can be used to gather inspection data traditionally collected by paper check sheets. Users can also collect data automatically from online sources. Reliability software takes the data and analyzes the condition of the equipment based on the rules users designate. For example, simple or complex mathematical calculations using data from several indicators can be set up and results compared to technical specifications and other acceptability parameters input to the software. Employees no longer need to remember or spend time repeating engineering calculations because the reliability software performs them automatically.

Without asset reliability software, it requires a significant amount of manpower to collect and interpret data. In today's market, companies need technology tools to help or even replace the manual analysis in order to be more competitive. The software collects and analyzes data (without manual intervention). It identifies the right work and then feeds the CMMS the right work to do at the right time.

### **The Total Reliability Solution**

In today's market, organizations are forced to do more with less. It is vital to provide a high level of asset reliability in a cost effective manner. With a reliability-driven approach to maintenance, companies ensure that their equipment is operating to desired performance levels. In fact, using a total reliability solution, many organizations have achieved significant results in cost reduction and improved equipment availability. Asset reliability is the key to improving plant output and uptime, creating high customer service levels, reducing costs, creating a safe environment and complying with environmental regulations. Optimizing asset reliability at the lowest cost is smart business.

### **Moving Ahead**

A recommended step forward for organizations seeking to achieve the goals of reliability-driven maintenance is to pilot Ivara's solution at one location. Many Ivara customers have taken advantage of this service to gain acceptance of the reliability solution at all levels of the organization to then roll out corporate wide. After seeing the solution in action, both tradespeople and management become adamant about its value.

Through a quick implementation for one or more of your critical assets - you will gain an appreciation of the value that a focus on asset reliability will bring to your organization, changing the way you conduct maintenance. Ivara EXP is the tool that facilitates a reliability-driven approach to maintenance.

To inquire about a pilot, please contact Ivara at 1-877-746-3787 or visit [www.ivara.com](http://www.ivara.com).